CLAIMS

1. A Method for stimulating the axonal growth of central nervous system (CNS) neurons said method comprising the steps of:

   a. contacting CNS neurons with an effective amount of an NgR antagonist; and

   b. contacting CNS neurons with an effective amount of an agent that activates the growth pathway of CNS neurons.

2. The method of claim 1, wherein said CNS neurons are mammalian.

3. The method of claim 1, further comprising contacting CNS neurons with a cAMP modulator that increases the concentration of intracellular cAMP.

4. The method of claim 3, wherein the cAMP modulator is selected from the group consisting of: cAMP analogues, activators of G protein coupled receptors that activate cAMP, adenylate cyclase activators, calcium ionophores, and phosphodiesterase inhibitors.

5. The method of claim 1, wherein said agent that activates the growth pathway of CNS neurons is inosine.

6. The method of claim 1, wherein said agent that activates the growth pathway of CNS neurons is oncomodulin.

7. The method of claim 1, wherein said agent that activates the growth pathway of CNS neurons is a growth factor selected from the group consisting of TGF-β, NGF, BDNF, NT-3, CNTF, IL-6, and GDNF.

8. The method of claim 1, wherein said agent that activates the growth pathway of CNS neurons is a hexose.

9. The method of claim 8, wherein said hexose is selected from the group consisting D-mannose, gulose and glucose-6-phosphate.

10. The method of claim 1, wherein said NgR antagonist is an agent that binds to NgR thereby inhibiting signaling mediated by NgR.

11. The method of claim 1, wherein said NgR antagonist is an agent that inhibits the expression of NgR.

12. The method of claim 1, wherein said NgR antagonist is an agent that inhibits the activity of a downstream signaling molecule that is activated by NgR.

13. The method of claim 12, wherein the downstream signaling molecule is RhoA.

14. The method of claim 13, wherein said agent is clostridium botulinum C3 ADP- ribosyltransferase.

15. The method of claim 1, wherein said NgR antagonist is an antibody that binds NgR.

16. The method of claim 1, wherein said NgR antagonist is an antibody that binds a NgR ligand.

17. The method of claim 1, wherein said NgR antagonist is a peptide.

18. The method of claim 17, wherein said peptide comprises a peptide that binds to NgR selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6 and SEQ ID NO: 7.

19. The method of claim 17, wherein said peptide comprises the amino acid residues of human NogoA set forth in SEQ ID NO: 14.

20. The method of claim 17, wherein said peptide comprises the amino acid residues of human NogoA forth in SEQ ID NO: 15.

21. The method of claim 17, wherein said peptide comprises the amino acid sequence of Nogo-66 set forth in SEQ ID NO: 16.

22. The method of claim 1, wherein said NgR antagonist is a soluble NgR protein.

23. The method of claim 22, wherein said soluble NgR protein comprises the amino acid sequence set forth in SEQ ID NO: 8 or in SEQ ID NO: 9.

24. The method of claim 22, wherein said soluble NgR protein is a soluble Nogo Receptor-1 polypeptide sequence selected from the group consisting of amino acid residues 26-344 of SEQ ID NO: 10; amino acid residues 26-310 of SEQ ID NO: 11; amino acid residues 26-344 of SEQ ID NO: 12; amino acid residues 27-344 of SEQ ID NO: 12; and amino acid residues 27-310 of SEQ ID NO: 13.

25. The method of claim 1, wherein said NgR antagonist is a nucleic acid aptamer that binds to NgR.

26. The method of claim 1, wherein said NgR antagonist is a defective NgR encoded by a DNA.

27. The method of claim 26, wherein said defective NgR is a dominant-negative NgR.

28. The method of claim 1, wherein said NgR antagonist is clostridium botulinum C3 ADP-ribosyltransferase encoded by DNA.

29. The method of claim 26 or 28, wherein said DNA is contained in a viral vector whereby administration of said vector is a means for contacting CNS neurons with an effective amount of NgR antagonist.

30. The method of claim 36, wherein said viral vector is AAV.

31. A method for treating a neurological disorder in a patient comprising the steps of:

a. administering an effective amount of an NgR antagonist to said patient; and

b. administering an effective amount of an agent that activates the growth pathway of CNS neurons to said patient.

32. The method of claim 31, wherein said neurological disorder is selected from the group consisting of traumatic brain injury, stroke, cerebral aneurism, spinal cord injury, Parkinson's disease, amyotrophic lateral sclerosis, Alzheimer's disease, diffuse cerebral cortical atrophy, Lewy-body dementia, Pick disease, mesolimbocortical dementia, thalamic degeneration, Huntington chorea, cortical-striatal-spinal degeneration, cortical-basal ganglionic degeneration, cerebrocerebellar degeneration, familial dementia with spastic paraparesis, polyglucosan body disease, Shy-Drager syndrome, olivopontocerebellar atrophy, progressive supranuclear palsy, dystonia musculorum deformans, Hallervorden-Spatz disease, Meige syndrome, familial tremors, Gilles de la Tourette syndrome, acanthocytic chorea, Friedreich ataxia, Holmes familial cortical cerebellar atrophy, Gerstmann-Straussler-Scheinker disease, progressive spinal muscular atrophy, progressive balbar palsy, primary lateral sclerosis, hereditary muscular atrophy, spastic paraplegia, peroneal muscular atrophy, hypertrophic interstitial polyneuropathy, heredopathia atactica polyneuritiformis, optic neuropathy, ophthalmoplegia, and retina or optic nerve damage.

33. The method of claim 31, wherein said agent that activates the growth pathway of CNS neurons is inosine.

34. The method of claim 31, wherein said agent that activates the growth pathway of CNS neurons is oncomodulin.

35. The method of claim 31, wherein said agent that activates the growth pathway of CNS neurons is a growth factor selected from the group consisting of TGF-β, NGF, BDNF, NT-3, CNTF, IL-6, and GDNF.

36. The method of claim 31, wherein said agent that activates the growth pathway of CNS neurons is a hexose.

37. The method of claim 36, wherein said hexose is selected from the group consisting D-mannose, gulose and glucose-6-phosphate.

38. The method of claim 31, wherein said NgR antagonist is an agent that binds to NgR thereby inhibiting signaling mediated by NgR.

39. The method of claim 31, wherein said NgR antagonist is an agent that inhibits the expression of NgR.

40. The method of claim 31, wherein said NgR antagonist is an agent that inhibits the activity of a downstream signaling molecule that is activated by NgR.

41. The method of claim 40, wherein the downstream signaling molecule is RhoA.

42. The method of claim 40, wherein said agent is clostridium botulinum C3 ADP- ribosyltransferase.

43. The method of claim 31, wherein said NgR antagonist is an antibody that binds NgR.

44. The method of claim 31, wherein said NgR antagonist is an antibody that binds a NgR ligand.

45. The method of claim 31, wherein said NgR antagonist is a peptide.

46. The method of claim 45, wherein said peptide comprises a peptide that binds to NgR selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6 and SEQ ID NO: 7.

47. The method of claim 45, wherein said peptide comprises the amino acid residues of human NogoA set forth in SEQ ID NO: 14.

48. The method of claim 45, wherein said peptide comprises the amino acid residues of human NogoA forth in SEQ ID NO: 15.

49. The method of claim 45, wherein said peptide comprises the amino acid sequence of Nogo-66 set forth in SEQ ID NO: 16.

50. The method of claim 31, wherein said NgR antagonist is a soluble NgR protein.

51. The method of claim 50, wherein said soluble NgR protein comprises the amino acid sequence set forth in SEQ ID NO: 8 or in SEQ ID NO: 9.

52. The method of claim 50, wherein said soluble NgR protein is a soluble Nogo Receptor-1 polypeptide sequence selected from the group consisting of amino acid residues 26-344 of SEQ ID NO: 10; amino acid residues 26-310 of SEQ ID NO: 11; amino acid residues 26-344 of SEQ ID NO: 12;

amino acid residues 27-344 of SEQ ID NO: 12; and amino acid residues 27-310 of SEQ ID NO: 13.

53. The method of claim 31, wherein said NgR antagonist is a nucleic acid aptamer that binds to NgR.

54. The method of claim 13, wherein said NgR antagonist is a defective NgR encoded by a DNA.

55. The method of claim 54, wherein said defective NgR is a dominant-negative NgR.

56. The method of claim 31, wherein said NgR antagonist is clostridium botulinum C3 ADP-ribosyltransferase encoded by a DNA.

57. The method of claim 54 or 56, wherein said DNA is contained in a viral vector whereby administration of said vector is a means for contacting CNS neurons with an effective amount of NgR antagonist.

58. The method of claim 57, wherein said viral vector is AAV.

59. A pharmaceutical composition comprising a NgR antagonist and an agent that activates the growth pathway of CNS neurons.

60. The pharmaceutical composition of claim 59, wherein the NgR antagonist is selected from the group consisting of an antibody, a peptide that binds to NgR, and a soluble NgR protein.

61. The pharmaceutical composition of claim 60, wherein the peptide is selected from the group consisting of the amino acid sequences set forth in SEQ ID NO: 1, SEQ ID NO: 2; SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7, SEQ ID NO: 14, SEQ ID NO: 15, and SEQ ID NO: 16.

62. The pharmaceutical composition of claim 60, wherein the soluble NgR protein is selected from the group consisting of the amino acid sequence set forth in SEQ ID NO: 8, the amino acid sequence set forth in SEQ ID NO: 9, amino acid residues 26-344 of SEQ ID NO: 10, amino acid residues 26-310 of SEQ ID NO: 11, amino acid residues 26-344 of SEQ ID NO: 12, amino acid residues 27-344 of SEQ ID NO: 12, and amino acid residues 27-310 of SEQ ID NO: 13.

63. The pharmaceutical composition of claim 59, wherein said composition is formulated for administration, the administration being selected from the group consisting of topical, pulmonary, internal topical, interdermal, parenteral, subcutaneous, intranasal, epidermal, ophthalmic, oral, intraventricular, and intrathecal.